



## **SUMMARY**

Mr. Loram is a recognized industry expert in the design and behavior of bolted joints. He has pioneered application of advanced technologies for optimization and problem solving in the electric power, petroleum chemical, refining, automotive, and structural application of bolting. Specializing in troubleshooting the assembly, testing, qualification, and maintenance of bolted joints he has assisted numerous clients with the resolution of particularly troublesome connections.

## **EDUCATION**

MS Mechanical Engineering, Stevens Institute of Technology  
BS, Mechanical Engineering, Rutgers University  
BS, Civil Engineering, University of New Haven  
Licensed Professional Engineer in California, Connecticut, Washington

## **PROFESSIONAL EXPERIENCE AND PROJECT SUMMARY**

### **Analyzed Numerous Boiler And Pressure Vessel Flanges Including:**

- Shell Canada - **Analysis of 10" , 1500 lb. flanges.**
- P.D. Glycol - **Analysis of 127" diameter reactor flanges.**
- Penwalt - **Analysis of stripper joints.**
- Procter and Gamble - **Analysis of 3500 psi hydrogen control valve bolted joints, Analysis of 18", 3500 psi hydrogen reactor joint, Analysis of hardening tube assembly procedure.**
- Citgo - **Analysis of 60" expander inlet spool piece flange.**
- Hemlock Semiconductor - **Analysis of large diameter, high temperature reactor flange.**
- Pfizer - **Developed preload recommendations for mixer to vessel bolted joint.**

**Ontario Power Production** - Principal consultant to Leak Reduction Team. Revised maintenance procedures, standardized gaskets and fasteners.

**Westinghouse PAD** - Designed and conducted test program to study compressive strains in the WA1G Lower Bearing Block vessel closure mechanism for shipboard nuclear reactors.

**Union Electric** - Consulted on the development of the Callaway Nuclear Plant Threaded Fastener Improvement program.

**Arkansas Nuclear One** - Reviewed assembly procedures of all safety related systems, analyzed joints and recommended fastener preloads.

**Electric Power Research Institute (EPRI)**

- Developed stud preload models and statistical techniques for predicting preload for large fasteners of heavy equipment supports. Methods were validated by experiments on 3" diameter heavy equipment support studs.
- Authored EPRI reports:
- NP2124: "A Study of Bolting Problems, Tools and Practices in the Nuclear Industry."
- NP-5067 "Good Bolting Practices" a reference manual for maintenance personnel.
- NP-6316 "Guidelines for Threaded Fastener Application in Nuclear Power Plants"
- Two hour videotape on leak prevention in bolted joints

**Atomic Industrial Forum (AIF) / Metals Properties Council**

- Conducted workshops on "Bolting Degradation and Failure in Nuclear Plants."
- Prepared a critique of ASME Boiler and Pressure Vessel Code relative to the treatment of bolt preloading. Presented findings to the Nuclear Regulatory Commission and ASME.

**South Texas Nuclear Plant**

- Reviewed and recommended changes to South Texas project Bolted Joint assembly procedures

**U.S. Army Tank Command** - Established torquing specifications for the M60 tank track threaded fasteners. Ten fold increase in track reliability was achieved. Consulted on failure analysis of M60 cylinder studs. Recommended modification of the nut bearing surface which resulted in a 50% increase in achieved stud preload at the specified torque.

**Ford** - Developed a computer program for the analysis of bolted joints in accordance with the VDI 2230 Analysis of High Duty Bolted Joints.

**Allis Mineral Systems** - Consulted on fatigue of large ball and sag mill bolted flanges.

**Caterpillar Tractor Co.** - Designed and managed the production of 20,000 ft. lb. assembly machines used to torque gland nuts on hydraulic piston rods.

**Raymond Engineering, Inc./Federal Highway Department** - Using an ultrasonic extensometer, measured insitu loads in A325 galvanized bolts and A490 black bolts which were installed in a bascule bridge. The tests were part of a study sponsored by federal DOT contract DTFH61-85-C-00174. The results were included in a report, "High Strength Bolts for Bridges" by J. Yura, et.al.

**Steinman ,Boynton, Gronquist & Birdsall** - Measured residual preload on Williamsburg Bridge cable clamp assembly.

**Port Authority of NY and NJ** - Measured stud preload on George Washington Bridge cable clamp assembly.

**Ellisor & Tanner Inc.** - Studied the preload of improperly installed A490 structural steel bolts in a forty story office building.

**TRAINING and PUBLICATIONS**

- Course Director for ASME Continuing Education Course “The Bolted Joint”.
- Conducted Bolted Joint in Plant Training Programs for:
  - General Electric Locomotive
  - Naval Air Warfare Center
  - Duke Power
  - Tennessee Valley Authority
  - Duquesne Power
  - Sealed Air
  - PetroCanada
  - Citgo
  - NASA
  - Knolls Atomic Power Lab
  - Purdoe Bay
  - Puget Sound Naval Shipyard
  - Tennessee Eastman
  - Dresser Rand
- ASME 2nd Biennial Movable Bridge Symposium, presented a paper on “The Use and Misuse of Galvanized Structural Bolts.” Discussed problems relating to the use of galvanized A325 structural bolts including: thread stripping, low installation preload, bolt failure. Recommended practices to alleviate this problem.